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| 10/050,866 | 01/18/2002 | Kiyoshi Yoshizumi | 218209US3 | 9246 |
| 22850 | 7590 | 08/04/2006 | EXAMINER | |
| C. IRVIN MCCLELLAND OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314 | | | HODGE, ROBERT W | |
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| | | | 1745 | |

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Please find below and/or attached an Office communication concerning this application or proceeding.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 6/27/06 have been fully considered but they are not persuasive.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivations to combine the references are found following each rejection made in the previous office action dated 5/2/06 and will not be reiterated.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response to applicant's argument that it would not be obvious to combine well known features of one reference in the prior art with another prior art reference all of which teach fuel cell systems, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the

Art Unit: 1745

basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Therefore the prior art rejections will be maintained.

Applicant's arguments, see Remarks/Argument, filed 6/27/06, with respect to the rejection of claims 6 and 31 under 35 U.S.C. 112, second paragraph have been fully considered and are persuasive. The rejection of claims 6 and 31 under 35 U.S.C. 112, second paragraph has been withdrawn.

The examiner acknowledges that applicants have added means plus function language to claims 13 and 15. However the Joerissen reference is capable of this function and the rejections will be maintained with further clarification.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 8, 13-15 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,696,188 hereinafter Boneberg et al. in view of WO 00/63993 hereinafter Joerissen et al.

Boneberg et al. teaches a fuel cell system being supplied with hydrogen and oxygen gases, which in turn generates electric power (column 3, lines 10-15) then mixing the exhaust gas streams from a fuel cell (figure 1 and column 5, lines 1-3) and combusting the mixture catalytically (column 2, line 15 and column 4, line 2) and then venting the combustion product to the atmosphere thus having a reduced hydrogen

Art Unit: 1745

content (figure 1 and column 5, line 3). The examiner notes that although the Boneberg et al. reference does not explicitly disclose a fuel cell system being fed hydrogen and oxygen gases, it does disclose that a preheated methanol/water mixture in gaseous form is fed to a gas generator, which is for the purpose of generating hydrogen (as disclosed in column 1, lines 10 et seq.) and because of this disclosure it is inherent that hydrogen and oxygen gas are fed to a fuel cell installation. It is also inherent that electric power will be generated by feeding a fuel cell hydrogen and oxygen gases, since this is the purpose of a fuel cell (this inherency statement applies to all proceeding rejections). Otherwise there would be no anode and cathode exhaust gases to be further reacted or used for preheating purposes in the system disclosed by Boneberg et al. The examiner further notes that the Boneberg et al. reference teaches that in a preferred embodiment a non-catalytic combustor would be preferred, however it still teaches the use of a catalytic combustor which is well known in the art, therefore it still reads on the claims as so recited.

Boneberg et al. does not teach a valve used to block the flow of hydrogen to the mixing portion, recycling hydrogen exhaust to the fuel cell inlet, the use of a hydrogen occluding alloy tank for hydrogen storage, a pump to pump hydrogen exhaust to the fuel cell inlet or hydrogen from the tank, a flow rate-reducing portion a gas-liquid separator used for just the cathode exhaust or a controller.

As per the provided German office action translation Joerissen et al. teaches "a fuel cell unit that is connected with a hydrogen storage device (in particular a metal hydride storage device) by means of a passage provided with a pressure reduction

Art Unit: 1745

valve (re claims 8 and 9, cf. (2): claims 1 and 4., Fig. 1 with pertinent description). From the anode chamber outlet of the fuel cell, unreacted hydrogen is returned to the anode chamber inlet by means of a pump (re claim 10, cf. (2): claim 1; Fig. 1 and pertinent description). Via a further passage with a valve, hydrogen-containing anode off-gas can be discharged from the circular flow (re claim 7, cf. (2): claim 7; Fig. 1 with pertinent description). The passages for discharging anode and cathode off-gas are provided with condensed water separators (re claims 6 and 19, cf. (2): claims 7 and 8., Fig. 1 with pertinent description).” Joerissen et al. also teaches a control/regulating unit for controlling the various devices as described above (abstract), which is capable of opening and/or closing the valve at regular intervals and also according to other factors such as concentration.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to include all of the features of Joerissen et al. to improve Boneberg et al.’s fuel cell system. The motivation for doing so would have been to provide a system that safely stores hydrogen and utilizes the supplied hydrogen to its fullest extent without waste. As well as adding a pump or flow rate-reducing portion to best control the supply of hydrogen to the fuel cell in order not to over load the fuel cell with too much pressure, but at the same time increasing the pressure when necessary. Adding a water separator to the cathode exhaust to remove all of the excess water that is formed during the reaction of hydrogen and oxygen in the fuel cell before entering the catalytic combustor to prevent it from being flooded and thus not being able to function.

Art Unit: 1745

And including a controller to control all of the various devices to properly regulate everything in the system so that it performs optimally.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Boneberg et al. in view of Joerissen et al. as applied to claims 1, 8, 13-15 and 50 above, and further in view of DE 4219113 hereinafter Heinen et al.

Boneberg et al. and Joerissen et al. do not teach the use of a diffusion member.

As per the provided German office action translation Heinen et al. teaches "off-gas tubes provided in the outlet portion with twisting or mixing elements or baffle plates to prevent a straight flowing of the off-gases and to promote the mixing-through with the ambient air (re claims 16 to 18 and 21 to 23, cf. (4) claims 1 and 3; column 1, lines 50 to 54; Fig. 2 with pertinent description)". The examiner notes that the mixing elements or baffle plates as taught by Heinen et al. are equivalent to the diffusion member or shield member of the instant application since the claimed structure is not specific as to what the actual member really is. And since the disclosure of the Heinen et al. reference performs the same function as the instant application it reads on the claims as so recited.

Boneberg et al., Joerissen et al. and Heinen et al. are analogous art because they are from similar problem solving area of exhausting off gasses from a system after a combustion reaction.

It would have been obvious to modify Boneberg et al. to include a shield or diffusion member at the exhaust port in order to prevent a straight flowing of the off-gases and to promote the mixing-through with the ambient air.

Art Unit: 1745

Claims 37-39 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boneberg et al. in view of Joerissen et al. as applied to claims 1, 8, 13-15 and 50 above, and further in view of U.S. Patent No. 2,850,038 hereinafter Shabaker.

Boneberg et al. and Joerissen do not teach any properties of the flow-rate reducing portion.

Shabaker teaches a flow control device for gaseous material employing variable diameter orifices that can in particular be smaller or larger depending on the control conditions (column 1, lines 15-21 and column 4, lines 3-60).

Boneberg et al., Joerissen et al. and Shabaker are analogous art because they are from similar problem solving area of controlling the flow of gases.

At the time of the invention it would have been obvious to a person having ordinary skill in the art to include the flow control device in the Boneberg et al. reference in order to properly control any and all of the gases in the system to optimally operate the system.

Claims 6 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,815,106 hereinafter Salvador et al.

Salvador et al. teaches that it is well known to use fuel cells in vehicular applications (column 2, line 9) and also teaches a fuel cell system that is fed hydrogen and oxygen gas for the purpose of generating electric power wherein the exhaust gases of the fuel cell are mixed in a combustor and are reacted to reduce the amount of hydrogen and vented to the atmosphere (figure 1 and column 4, lines 23 et seq.). Salvador et al. further teaches the use of a pressure-loss member in the cathode

Art Unit: 1745

exhaust line (column 3, lines 5-7) as well as the use of condensers to remove water from the gas streams (column 4, lines 46-47 and figure 1).

Salvador et al. does not teach the specific order of the components as claimed in claim 6.

At the time of the invention it would have been obvious to a person having ordinary skill in the art to switch the order as to which the exhaust gases flow so as to have them first flow through the condenser and then the combustor, thus removing moisture which could cause the combustor's catalyst to fail due to flooding of the catalyst sites and since it has been held that a mere reversal of essential working parts of a device involves only routine skill in the art. In re Einstein, 8 USPQ 167.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 1745

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert Hodge whose telephone number is (571) 272-2097. The examiner can normally be reached on 8:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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